

Claims

What Is Claimed Is:

1. An apparatus for conditioning air, comprising:
a housing defining an input port and an output port;
an electro-kinetic system, disposed in the housing, to create an airflow moving from the input port to the output port, the electro-kinetic system including:
a first electrode array;
a second electrode array; and
a high voltage generator adapted to provide a potential difference between the first electrode array and the second electrode array;
wherein the first electrode array is located closer to the input port than is the second electrode array, and the first electrode array includes a generally tubular electrode; and
wherein the second electrode array is located closer to the output port than is the first electrode array, and the second electrode array includes inner and outer generally tubular electrodes electrically connected to one another, with the inner electrode located at least partially within the outer electrode.
2. The apparatus of claim 1, wherein each of the generally tubular electrodes of the first and second electrode arrays include a generally circular cross section.
3. The apparatus of claim 1, wherein each of the generally tubular electrodes of the first and second electrode arrays comprises a hollow elongated cylinder.
4. The apparatus of claim 1, wherein each of the inner and outer generally tubular electrodes of the second electrode array has a distal edge that generally faces toward the first electrode array; the distal end of the inner electrode being substantially flush with the distal edge of the outer electrode.

5. The apparatus of claim 1, wherein each of the inner and outer generally tubular electrodes of the second electrode array has a distal edge that generally faces toward the first electrode array; the distal edge of the inner electrode being staggered from the distal edge of the outer electrode.
6. The apparatus of claim 5, wherein the distal edge of the outer electrode of the second electrode array is located closer to the first electrode array than is the distal edge of the inner electrode of the second electrode array.
7. The apparatus of claim 1, wherein each of the inner and outer generally tubular electrodes of the second electrode array has a distal edge that tapers toward the first electrode array.
8. The apparatus of claim 7, wherein the generally tubular electrode of the first electrode array includes a distal edge that tapers toward the second electrode array.
9. The apparatus of claim 1, wherein each of the generally tubular electrodes of the first and second electrode arrays generally shares a common central axis.
10. The apparatus of claim 9, wherein a radius of the generally tubular electrode of the first electrode array is larger than a radius of the inner electrode of the second electrode array, but smaller than a radius of the outer electrode of the second electrode array.
11. The apparatus of claim 1, further comprising a germicidal ultraviolet lamp, disposed in the housing, adapted to emit radiation; wherein at least a portion of the airflow is subjected to at least a portion of radiation emitted by the lamp.

12. The apparatus of claim 11, wherein the housing is configured to preclude human viewing of radiation emitted directly from the lamp.

13. The apparatus of claim 12, wherein relative to air entering the input port, air exiting the output port of the housing has at least one of: (a) reduced levels of microorganisms; (b) reduced amount of particulate matter; (c) ions; and (d) ozone.

14. The apparatus claim 1, further including a wettable material disposed in the housing to augment the airflow with at least one of: (a) humidity; (b) scent; and (c) medicinal content.

15. The apparatus of claim 1, wherein:

the first electrode array includes at least one additional generally tubular electrode, with each of the generally tubular electrodes of the first electrode array being generally concentric and electrically connected to one another; and

the second electrode array includes at least one additional generally tubular electrode, with each of the generally tubular electrodes of the second electrode array being generally concentric and electrically connected to one another.

16. An apparatus for conditioning air, comprising:

a housing defining an input port and an output port;

an electro-kinetic system, disposed in the housing, to create an airflow moving from the input port to the output port, the electro-kinetic system including:

a first electrode array;

a second electrode array downstream from the first electrode array; and

a high voltage generator adapted to provide a potential difference between the first electrode array and the second electrode array;

wherein the first electrode array includes a generally tubular electrode; and

wherein the second electrode includes inner and outer generally tubular electrodes electrically connected to one another, with the inner electrode located substantially within the outer electrode.

17. The apparatus of claim 16, wherein each of the generally tubular electrodes of the first and second electrode comprises a hollow elongated cylinder.

18. The apparatus of claim 16, wherein each of the inner and outer generally tubular electrodes of the second electrode array have a distal edge that generally faces toward the first electrode array; the distal edge of the inner electrode being staggered from, rather than flush with, the distal edge of the outer electrode.

19. The apparatus of claim 16, wherein:

each of the generally tubular electrodes of the first and second electrode arrays generally shares a common central axis; and

wherein a radius of the generally tubular electrode of the first electrode array is larger than a radius of the inner electrode of the second electrode array, but smaller than a radius of the outer electrode of the second electrode array.

20. The apparatus of claim 16, comprising:

the first electrode array includes at least one additional generally tubular electrode, with each of the generally tubular electrodes of the first electrode array being generally concentric and electrically connected to one another; and

the second electrode array includes at least one additional generally tubular electrode, with each of the generally tubular electrodes of the second electrode array being generally concentric and electrically connected to one another.

21. An electro-kinetic system, comprising:

a first electrode array;

a second electrode array; and
a high voltage generator adapted to provide a potential difference between the first electrode array and the second electrode array;
wherein the first electrode array includes a generally tubular electrode; and
wherein the second electrode array includes inner and outer generally tubular electrodes electrically connected to one another with the inner electrode located substantially within the outer electrode.

22. The system of claim 21, wherein each of the generally tubular electrodes of the first and second electrodes includes a generally circular cross section.

23. The system of claim 21, wherein each of the generally tubular electrodes of the first and second electrodes comprises a hollow elongated cylinder.

24. The system of claim 21, wherein each of the inner and outer generally tubular electrodes of the second electrode array has a distal edge that generally faces toward the first electrode array; the distal edge of the inner electrode being substantially flush with the distal edge of the outer electrode.

25. The system of claim 21, wherein each of the inner and outer generally tubular electrodes of the second electrode array have a distal edge that generally faces toward the first electrode array; the distal edge of the inner electrode being staggered from, rather than flush with, the distal edge of the outer electrode.

26. The system of claim 25, wherein the distal edge of the outer electrode of the second electrode array is located closer to the first electrode array than is the distal edge of the inner electrode of the second electrode array.

27. The system of claim 21, wherein each of the inner and outer generally tubular electrodes of the second electrode array has a distal edge that tapers toward the first electrode array.

28. The system of claim 27, wherein the generally tubular electrode of the first electrode array includes a distal edge that tapers toward the second electrode array.

29. The system of claim 21, wherein each of the generally tubular electrodes of the first and second electrode arrays generally shares a common central axis.

30. The system of claim 29, wherein a radius of the generally tubular electrode of the first electrode array is larger than a radius of the inner electrode of the second electrode array, but smaller than a radius of the outer electrode of the second electrode array.

31. The system of claim 21, wherein:

the first electrode array includes at least one additional generally tubular electrode, with each of the generally tubular electrodes of the first electrode array being generally concentric and electrically connected to one another; and

the second electrode array includes at least one additional generally tubular electrode, with each of the generally tubular electrodes of the second electrode array being generally concentric and electrically connected to one another.

32. The system of claim 21, wherein the first and second electrode arrays are adapted to be placed in a housing of a freestanding apparatus for conditioning air.

33. The system of claim 21, wherein the first and second electrode arrays are adapted to be placed in a housing of a personal device for conditioning air, the housing including a compartment to store a battery capable of powering the high voltage generator.